

The impacts of personal knowledge and risk perception on the effectiveness of behavioural change interventions for COVID-19 in Jakarta and South Sulawesi

Authors:

Associate Professor Simon Reid, Co-lead

The University of Queensland

Dr Ansariadi, Co-lead

Universitas Hasanuddin

Ms Alexandra Robbins-Hill, Project Participant

The University of Queensland

Dr Sheleigh Lawler, Project Participant

The University of Queensland

Editors

Dr Eugene Sebastian, Executive Director, AIC

Helen Brown, Lead, Communications and Outreach, AIC

Mary Downes, Editor, MediaXpress

David Sexton, Digital Communications Coordinator, AIC

Report translated by:

Uswatul Chabibah

Designed by:

Jesse Kartomi Thomas

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I am delighted to share our findings from the Partnership for Australia-Indonesia Research (PAIR) COVID-19 Rapid Research series.

As the pandemic continues, it disrupts economies, jobs, education, and health systems worldwide. To address the pressing challenges in Indonesia, we have brought together teams of interdisciplinary researchers from both Australia and Indonesia to explore COVID-19's impact on people. We focus on three areas: health, connectivity and economic recovery.

The report provides the policy community with timely access to the best available evidence. It also responds to the Australian government's Partnerships for Recovery strategy. The strategy aims to understand and support Indonesia as it deals with and recovers from the pandemic.

Warm regards,



Dr Eugene Sebastian
PAIR Program Director
The Australia-Indonesia Centre

EXECUTIVE SUMMARY

To cope with the impacts of COVID-19, Indonesians have been asked to adopt measures that were disruptive to daily life and, for many people, often difficult to follow given their living and working situations.

These were measures such as social distancing, staying at home, wearing a mask and increased handwashing.

Control measures are designed to interrupt the transmission of the virus and introducing them was essential to limiting the spread from infected people, and minimising the risk through increased hygiene. Indonesia at one point was dealing with the highest COVID-19 infection rate in Southeast Asia, causing huge strain on the health system and widespread illness in communities. The virus has infected 4.5 million people across the country, although it is estimated that the figure is higher than official reports.

Given that compliance with the control measures is critical to success in protecting people and systems, this report looks at the uptake of public messaging about COVID-19. Understanding the complexities around behavioural change is integral to managing a health crisis, particularly in densely populated countries like Indonesia. The team behind this study chose two communities to explore their level of adherence to COVID-19 measures: participants from the capital city of Jakarta and the province of South Sulawesi were asked questions about knowledge, attitudes and practice, risk perception, beliefs, and trust in government and control measures.

Overall, participants from Jakarta reported higher levels of compliance with control measures, lower levels of risky behaviour, higher health literacy and more accurate beliefs compared with respondents from South Sulawesi. Participants in Jakarta also reported higher levels of trust in government and lower levels of negative attitudes regarding the level of government control. The findings indicate that individuals with higher levels of literacy and education who display more accurate beliefs are more likely to report compliance with COVID-19 protective behaviours.

People in South Sulawesi, meanwhile, reported higher rates of participation in behaviours deemed risky for the transmission of COVID-19 compared with those in Jakarta.



Image credit: Mufid Majnun

This study also shows that an individual's personal experience of COVID-19 is not necessarily a good predictor of high levels of risk perception, which could be assumed to motivate compliance. A critical element of this was that low trust in government was associated with poor compliance behaviour, especially in South Sulawesi.

Our study results showed that trust in government was a powerful moderator of the traditional association that exists between high risk perception and compliance with public health directives. People who perceive they have high risk levels of a health condition such as COVID-19 typically are more likely to comply with public health directives designed to protect them. However, what we observed in Makassar was that this association was weak and this was coupled with low trust in government. Our Indonesian co-author confirmed that governance of COVID-19 in Makassar was poor and this was exacerbated by political instability and the inherent complexity of the government structures. A devolved administrative structure in Indonesia results in multiple government actors communicating and instigating measures that at times conflict. There also could be other explanations that are still to be explored. Adding to the complexity was that many respondents had experienced the loss of family members to COVID-19, and this of course could also explain compliance in some areas. Most likely it is a complex interplay of a number of variables.

Other findings include the significant role of local governance in achieving high levels of compliance with public health interventions. One researcher identified several factors associated with poor governance of the local COVID-19 response that were directly linked to public resistance to and demonstrations against public health measures. This suggests that good governance could be the most important determinant of public acceptance and compliance.

Ultimately, the report makes a key recommendation for all levels of government that can help inform policy decisions around important public messaging.

Risk communication should not be directed at risk avoidance, but rather to inform the public and present clear, consistent and equitable statements to enhance trust as a primary goal.

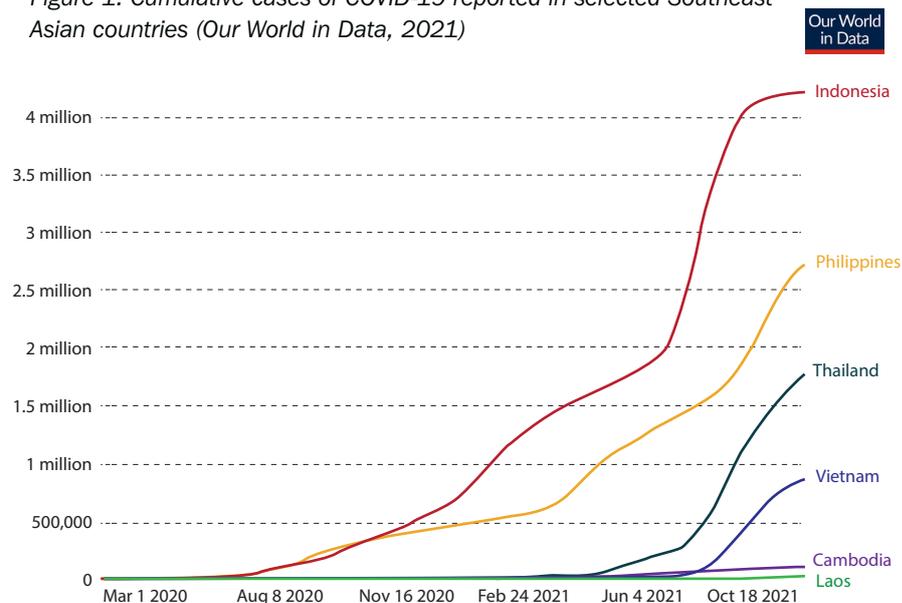
INTRODUCTION

Coronavirus disease 2019 (COVID-19), caused by infection with severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), emerged in China at the end of 2019. Its subsequent global spread led to a significant pandemic with 240,260,449 confirmed cases and 4,890,424 deaths.¹ Indonesia recorded its first case of COVID-19 in March 2020.² At the time this report was being prepared, it had reported the most cases and deaths in Southeast Asia (Figure 1).

To date there have been 4.25 million confirmed cases of COVID-19 in Indonesia, resulting in 142,763 reported deaths.³ However, reports of discrepancies in the available data have driven concerns about inaccurate reporting, which raises the possibility that the actual number of cases and deaths is substantially higher.⁴ There is no serological data that would provide an estimate of under-reporting in Indonesia. However, several studies using different methodologies have shown that under-reporting can be significant. For example, one study from India estimated that only 5 percent of cases may be reported if the case fatality rate is 10 percent⁵ and a further study in countries most affected in 2020 estimated that only 1-2 percent of cases had been detected.⁶ Therefore, it is possible that a conservative estimate of the true number of cases in Indonesia is at least 84 million, based on the Indian estimate.

Vaccines to prevent severe COVID-19 became available at the end of 2020 and the first doses were administered in Indonesia on 13 January 2021. Since then, 21.47 percent of people have been fully vaccinated and about 40 percent have had a single dose.⁷ However, the true rate of immunity may be significantly higher given the large number of cases that have been reported in Indonesia, and the likely large number of unreported/undetected cases. Indeed, the falling transmission rate in Indonesia was attributed to the impact of vaccination, which may in fact be augmented by natural immunity in a large proportion of the population.⁸

Figure 1. Cumulative cases of COVID-19 reported in selected Southeast Asian countries (Our World in Data, 2021)



The first and second waves of COVID-19 have been reportedly linked to religious holidays, in which millions of individuals travelled back to their hometowns to participate in the Eid holiday,⁹ which resulted in the geographic spread of COVID-19 from Jakarta to other areas of Java. In addition, a surge in cases of the COVID-19 Delta variant coincided with the Eid Haj holiday in July 2021.¹⁰ This second wave of COVID-19 was associated with a doubling of the number of fatalities and negative impacts on health systems' capacity.¹¹

The effect of COVID-19 on the wellbeing of Indonesians has been substantial with the National Development Planning Agency (BAPPENAS) estimating that the number of unemployed people in Indonesia increased by 4 million to 5.5 million people in 2020 (8.1-9.2 percent) and by 10.7 million up to 12.7 million people in 2021.¹² The hardest-hit industries included manufacturing, which employs 18 million workers, of which a currently estimated 9.8 million are either furloughed (about 70 percent) or laid off (30 percent).¹³ Exacerbating this, the pandemic has lowered the global demand for export products, reduced foreign direct investments and triggered a drop in tourism, negatively affecting small and medium-sized businesses.

1. World Health Organization (WHO), *WHO Coronavirus (COVID-19) Dashboard* [website], (accessed 19 October 2021). 2. D.N. Aisyah et al., 'A spatial-temporal description of the SARS-CoV-2 infections in Indonesia during the first six months of outbreak', *PLOS One*, 2020, 15. 3. WHO, 2021. 4. B.A. Djaafara et al., 'Using syndromic measures of mortality to capture the dynamics of COVID-19 in Java, Indonesia, in the context of vaccination rollout', *BMC Medicine*, 2021, 19, 146. 5. J. Unnikrishnan, S. Mangalathu, & R.V. Kutty, 'Estimating under-reporting of COVID-19 cases in Indian states: an approach using a delay-adjusted case fatality ratio', *BMJ Open*, 2021, 11. 6. H. Lau et al., 'Evaluating the massive underreporting and undertesting of COVID-19 cases in multiple global epicenters', *Pulmonology*, 2021, 27, 110-115. 7. WHO, 2021. 8. Djaafara et al. 9. S. Hasyim, 'Lesson Learnt: Indonesia's Second Eid al-Fitri under Covid-19', *Fulcrum* [website], 21 May 2021, <https://fulcrum.sg/lesson-learnt-indonesias-second-eid-al-fitri-under-covid-19/> 10. S. Wijaya, 'Indonesians come up for air in the wake of their second wave of COVID-19', *Australian Broadcasting Corporation*, 24 September 2021. 11. Ibid. 12. Bappenas [website], <https://www.bappenas.go.id/en> 13. Ibid.

SARS-CoV-2 transmission

SARS-CoV-2 has two features that make it more difficult to control than SARS. First, it is most infectious before the development of symptoms (asymptomatic transmission).¹⁴ Second, it can be transmitted through fine, respiratory aerosols.¹⁵ Asymptomatic transmission is problematic because it reduces the efficacy of control measures based on the detection and isolation of clinical cases that were effective in the outbreak of SARS in 2003.¹⁶

Transmission of SARS-CoV-2 occurs through droplets from the nose or mouth that are expelled when an infected person coughs, sneezes or talks. Infection occurs when a susceptible person inhales droplets or touches contaminated surfaces, then touches a mucous membrane (eyes or mouth).¹⁷ Normal speaking can be an important mode of transmission for COVID-19, with reports suggesting small particles are able to remain airborne for minutes or longer in poorly ventilated areas.¹⁸ Early predictions of an outbreak of SARS-CoV-2 were reported following an estimated reproduction number (RO) of the virus ranging between 2.24 to 3.58, highlighting its ability to not only be transmitted easily, but also infect a relatively large number of people in a short period of time.¹⁹

COVID-safe behaviour

Control measures for COVID-19 are designed to impede transmission by preventing the emission of virus from infected people (masks, physical distancing, and movement and density controls), and through improved hand hygiene and environmental cleaning. Current vaccines do not significantly prevent infection, rather they prevent severe lung disease and hospitalisations.²⁰

The implementation of behaviours that minimise and mitigate the spread of disease are important in ensuring residents can return to life as normal, with adherence to established protocols. The recommended prevention behaviours²¹ at an individual level included:

- mask wearing in public spaces
- improved hand hygiene and environmental cleaning
- physical distancing by avoiding workplaces or decreased room densities
- isolation of suspected or confirmed cases

Recommendations at a national level included:

- quarantine of returned travellers
- closure of borders to international arrivals
- provision of social support services to ensure compliance with individual-level behaviours

Of particular concern in the Indonesian context is the safety of vulnerable populations – including poorer households and slum residents. While some research indicates that these populations are less likely to comply with public health measures due to economic reasons (i.e. wearing a disposable mask, purchasing sanitising products), they are more susceptible to the virus.²² Urban slums, which are crowded and tend to have more enclosed, poorly ventilated settings, can amplify transmission of COVID-19 to vulnerable populations because it is difficult for people to implement effective and recommended health protocols such as social distancing, isolation, and maintaining sanitary surfaces. In Indonesia, the lack of assistance for people unable to attend work due to lockdowns in these slums or a requirement to quarantine forced many to breach public health mandates to provide for their families.²³

Protocols were established at a national level in Indonesia with all levels of government responsible for implementation. In rural areas, local communities were responsible for ensuring policies were put in place. Indonesia's COVID-19 outbreak response required two simultaneous approaches – first to prevent the spread of disease, and second to introduce social assistance programs to alleviate socioeconomic repercussions.²⁴

14. H. Nishiura, N.M. Linton, & A.R. Akhmetzhanov, 'Serial interval of novel coronavirus (COVID-19) infections', *International Journal of Infectious Diseases*, 93, 284-286 and L. Tindale et al., 'Evidence for transmission of COVID-19 prior to symptom onset', *Elife*, 2020, 9. 15. V. Stadnytskyi et al., 'The airborne lifetime of small speech droplets and their potential importance in SARS-CoV-2 transmission', *Proceedings of the National Academy of Sciences*, 2020, 117. 16. J.S. Peiris et al., 'The severe acute respiratory syndrome', *New England Journal of Medicine*, 2003, 349. 17. Stadnytskyi et al., 2020. 18. Stadnytskyi et al and P. Anfinrud et al., 'Visualizing Speech-Generated Oral Fluid Droplets with Laser Light Scattering', *New England Journal of Medicine*, 2020, 382 and S. Zhao et al., 'Preliminary estimation of the basic reproduction number of novel coronavirus (2019-nCoV) in China, from 2019 to 2020: A data-driven analysis in the early phase of the outbreak', *International Journal of Infectious Diseases*, 2020, 92, 214-217. 19. Zhao et al., 2020. 20. Y. J. Fan, K.H. Chan, & I. F. Hung, 'Safety and Efficacy of COVID-19 Vaccines: A Systematic Review and Meta-Analysis of Different Vaccines at Phase 3', *Vaccines (Basel)*, 2021, 9. 21. WHO, 2020. 22. I.N. Sutarsa, I.M.A. Wirawan, & P.A.S. Astuti, "Nine months and no progress": What went wrong in Indonesia's COVID-19 responses and what can be done', *The Jakarta Post*, 3 December 2020. 23. Ibid. 24. D. Susilo, E. Hidayat, & R.F. Marta, 'Village public innovations during COVID19 pandemic in rural areas: Phenomena in Madura, Indonesia', *Cogent Social Sciences*, 2021, 7.

Communication

In the context of a dynamic pandemic, in which mitigation of the spread of disease is particularly reliant on population compliance, it is important to understand the underlying motivations that exist at a population level, and how we can encourage behaviour change for the greater good. This is because the responses require the adoption of multiple new behaviours that may change at a population level over time. Risk communication and community empowerment are critical tools used to improve the adoption of protective individual-level behaviours. In Indonesia, the national government developed good coordination mechanisms that included a dedicated COVID-19 hotline that provides information 24 hours a day, seven days a week that could be accessed by the community.²⁵ A review of the country's response identified that it was necessary to improve the involvement of local community organisations,²⁶ a particular issue in rural areas. However, the Indonesian culture of solidarity and collaboration may prevent communication issues in rural areas where village-based family welfare empowerment teams actively participated in local COVID-19 responses by ensuring good communication and community support for disadvantaged families.²⁷

Health literacy

The factors driving compliance are nuanced and dependent on many variables. While human behavioural theories highlight the reliance on accurate information being disseminated to individuals for them to enact behavioural changes, many individuals still refuse to comply. Research shows that sociodemographic variables (including gender, education, marital status, having children)²⁸ and personality traits²⁹ play a role in one's intent to comply with population measures. However, a person must first understand public health messages before they can form their intent.

Several factors affect people's ability to understand public health messages aimed at changing their perception of COVID-19 and their individual behaviours. These factors are complex and vary at an individual level because people have different levels of risk perception based on:

- their social, demographic and educational background³⁰
- how their experience of disease impacts on their wellbeing/lifestyle or that of people they know³¹
- their perceptions of the severity of illness and their personal susceptibility³²

- their perception of the efficacy and cost (including social cost) of the required behaviours³³
- the information they receive and the source of that information (i.e. formal v informal sources)³⁴
- their political views and trust in authority³⁵
- their knowledge and health literacy (ability to read, interpret and apply recommended behaviours)³⁶

Risk perception

The variances in individual behaviour suggest that risk perception may be a strong modifier of disease transmission because it changes a person's compliance with the desired behaviours, which in turn influences the number of new positive cases.³⁷ To add to the complexity, risk perception works in combination with other factors, such as knowledge, health literacy, perceived impact, trust in professionals and trust in government.³⁸ Individuals or population groups that have low levels of health literacy and little trust in institutions may be less likely to follow recommendations to address science-based problems, making it difficult to implement policies to mitigate the spread of disease.³⁹

25. E. Wulandari et al., 'The First Intra-Action Review of Indonesia's Response to the COVID-19 Pandemic', *Health Secur*, 2020, 19, 521-531.

26. Ibid. 27. M.N. Aung et al., 'Community responses to COVID-19 pandemic first wave containment measures: a multinational study', *Journal of Infection in Developing Countries*, 2021, 15, 1107-1116. 28. M.H. Haischer et al., 'Who is wearing a mask? Gender, age, and location-related differences during the COVID-19 pandemic', *PLOS ONE*, 2020, 15, and D. Lüdecke & O. Von dem Knesebeck, 'Protective Behavior in Course of the COVID-19 Outbreak—Survey Results From Germany', *Frontiers in Public Health*, 2020, 8, and S. Uddin et al., 'How did socio-demographic status and personal attributes influence compliance to COVID-19 preventive behaviours during the early outbreak in Japan? Lessons for pandemic management', *Personal and Individual Differences*, 2021, 175. 29. D.S. Zanini et al., 'Practicing Social Isolation During a Pandemic in Brazil: A Description of Psychosocial Characteristics and Traits of Personality During COVID-19 Lockout', *Frontiers in Sociology*, 2021, 6, and A.M. Nofal, G. Cacciotti, & N. Lee, 'Who complies with COVID-19 transmission mitigation behavioural guidelines?', *PLOS ONE*, 2020, 15. 30. ACSQHC, 'Health literacy: Taking action to improve safety and quality', Sydney, 2014. 31. Ibid and R.D. Smith, 'Responding to global infectious disease outbreaks: lessons from SARS on the role of risk perception, communication and management', *Social Science & Medicine*, 2006, 63, 3113-23. 32. M. Barr et al., 'Pandemic influenza in Australia: using telephone surveys to measure perceptions of threat and willingness to comply', *BMC Infectious Diseases*, 2008, 8, 117, and M. Bults et al., 'Perceived risk, anxiety, and behavioural responses of the general public during the early phase of the Influenza A (H1N1) pandemic in the Netherlands: results of three consecutive online surveys', *BMC Public Health*, 2011, 11, 2, and G.S. Mesch & K.P. Schwirian, 'Confidence in government and vaccination willingness in the USA', *Health Promotion International*, 2014, 30, 213-221. 22. Smith et al., 2006. 34. D. Kassulke et al., 'Information-seeking behaviour and sources of health information: associations with risk factor status in an analysis of three Queensland electorates', *Australian Journal of Public Health*, 1993, 17, 51-57, and G. Prati, L. Pietrantoni, & B. Zani, 'Compliance with recommendations for pandemic influenza H1N1 2009: the role of trust and personal beliefs', *Health Education Research*, 2011, 26, 761-769. 35. Bults et al., 2011, Mesch & Schwirian, 2014, Prati et al., 2011. 36. ACSQHC, 2014. 37. L. Cori et al., 'Risk Perception and COVID-19', *International Journal of Environmental Research and Public Health*, 2020, 17, 3114. 38. J.M. Clements, 'Knowledge and Behaviours Toward COVID-19 Among US Residents During the Early Days of the Pandemic: Cross-Sectional Online Questionnaire', *JMIR Public Health and Surveillance*, 2020, 6, e19161. 39. Wijaya, 2021.



Image credit: Viki Mohamad

Following the two waves of COVID-19 cases associated with Eid in Indonesia, it has been reported there are concerns about the resumption of travel around the Christmas periods. One report suggests that the mental and emotional consequences of lockdowns and restrictions have been associated with a possible rebellion against travel curbs.⁴⁰ The report cites a local epidemiologist who claims that people “will [often] go on holidays to as many places and times as they can to compensate for missing out”. While the movement of people is inevitable when restrictions have eased, it is important to appropriately communicate risks to the public.

Accuracy and accessibility of information

A report released by the UN Office for the Coordination of Humanitarian Affairs (OCHA) identified the importance of maintaining public

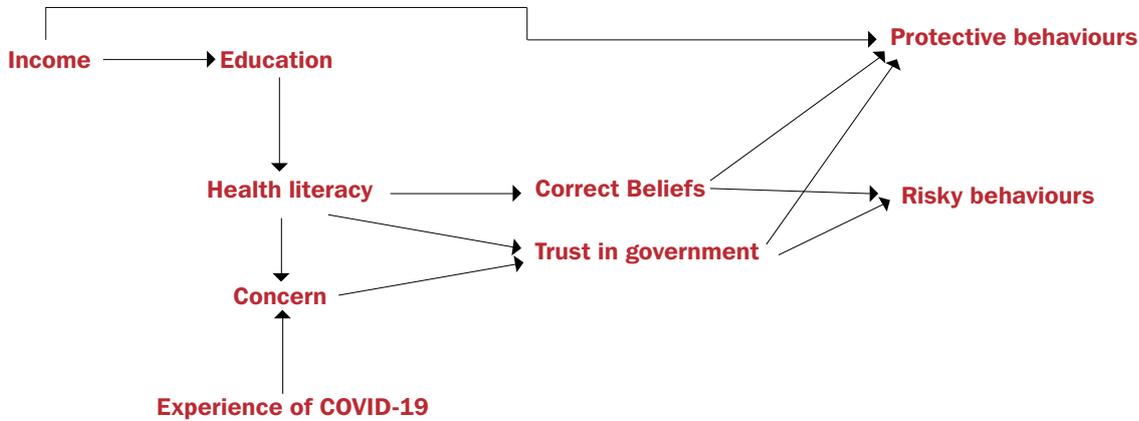
trust in the government and health authorities by using messages and instructions (including to protect the public from incorrect information).⁴¹ OCHA developed and disseminated appropriate visual health messaging throughout Indonesia to support communities in preventing the spread of disease. Following concerns in Indonesia over the spread of confusing information about COVID-19, the website *KawalCOVID19*⁴² was established to provide accurate and accessible information to the population, and to counter misinformation. This site is a source of information on voluntary initiatives for health practitioners, academics and professionals, to provide information, verification and education to the wider community.

There is a lack of published and unpublished reports of studies to determine the rates and drivers of compliance with government-mandated protective behaviours in

Indonesia. Therefore, this research project investigated the factors associated with compliance and lack of compliance with COVID-19-related regulations and interventions in Indonesia. Since completing the data collection, a single study has now been published that sought to identify factors associated with people’s intentions to practise social distancing in Indonesia.⁴³ That study demonstrated the importance of risk perception as a driver of compliance and the role media plays in establishing norms and shaping perceived behavioural control, which were highly correlated with intention to engage in social distancing.⁴⁴

40. Ibid. 41. OCHA, Indonesia: COVID-19 response Multi Sectoral Response Plan Report No. 02, (As of 27 August 2020), Jakarta, UN Office for the Coordination of Humanitarian Affairs, 2020. 42. *KawalCOVID19* [website], <https://kawalcovid19.id/>, (accessed 20 October 2021). 43. W. Adiyoso & Wilopo, ‘Social distancing intentions to reduce the spread of COVID-19: The extended theory of planned behavior’, *BMC Public Health*, 2021, 1836. 44. Ibid.

Figure 2. Theoretical behavioural model that is the basis for variable selection



METHODOLOGY

The overall aim of this study is to understand the factors associated with compliance and lack of compliance with regulations and behaviour change interventions relating to the mitigation and control of COVID-19 in two major population centres in Indonesia. To achieve this aim we will address the following objectives:

- understand the factors associated with compliance and lack of compliance with regulations relating to the mitigation and control of COVID-19 in Jakarta and South Sulawesi
- determine how compliance and risk perception are changed by the way governments publish and interpret disease data
- evaluate the coherence of formal and informal communication pathways

An existing questionnaire was adapted for use in the project and translated into Indonesian. The questionnaire has been successfully deployed in Australia and California and is designed to collect data

on an individual’s experiences of COVID-19 and their support for the mitigation efforts in their local area. The survey asks questions about the following areas:

- individual levels of stress and the factors that lead them to being stressed
- practice of required protective behaviours
- individual perception of their own risk and the risk they present to others
- knowledge of COVID-19, government regulations and required protective behaviours
- attitudes towards the current restrictions and protective behaviours and the sources of information and level of trust in each source
- the understanding of formal disease data/risk estimation presented by the governments

45. B. Gardner et al., ‘Developing habit-based health behaviour change interventions: twenty-one questions to guide future research’, *Psychology & Health*, 2021, doi: 10.1080/08870446.2021.2003362



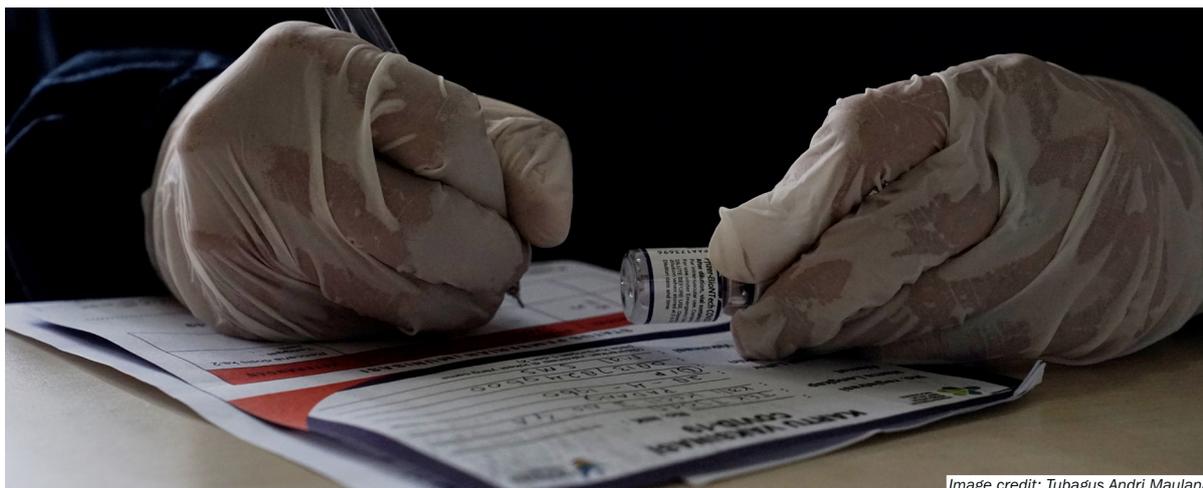


Image credit: Tubagus Andri Maulana

The questions used in the survey were sourced from the following expert inputs and published survey tools:

1. Habits around hygiene

Habit items, adapted from a British study that began in April 2020,⁴⁵ focused on habit psychology.

2. Perceived threat, government response, impacts and experiences

Conway, L.G., III, Woodard, S.R., & Zubrod, A., Social Psychological Measurements of COVID-19: Coronavirus Perceived Threat, Government Response, Impacts, and Experiences Questionnaires, 2020, <https://doi.org/10.31234/osf.io/z2x9a>

3. Pandemic Stress Index

Harkness, A., The Pandemic Stress Index, University of Miami, 2020.

4. Covid-19 household environmental scale

Behar-Zusman, V., Chavez, J.V. and Gattamorta, K., (In Preparation), Developing a Measure of the Impact of COVID-19 Social Distancing on Household Conflict and Cohesion, 2020.

5. Health literacy

Harkness, A., The Pandemic Stress Index, University of Miami, 2020.

The finalised survey comprised 107 questions that were translated by the Indonesian research team, and deployed between 20 July 2021 and 29 July 2021 using a commercial survey provider Qualtrics (<https://www.qualtrics.com/au/>).

The survey was sent to two samples of 300 individuals in Jakarta and South Sulawesi to enable comparison between the largest metropolitan city (Jakarta) and a regional location (South Sulawesi) to explore variation in health behaviours and the factors driving this variation.

The database of responses was translated back into English and appropriately cleaned and coded for analysis in IBM SPSS Statistics for Macintosh, Version 27.0.

The variables of interest were selected based on the behavioural model displayed in Figure 2. To determine associations between the dependent and independent variables in the two locations in Indonesia, the variables were transformed into categorical ordinal variables and the statistical significance of any differences determined using the chi-squared test of independence at a 95 percent level of confidence.

ANALYSIS AND RESULTS

Participants

Overall, 602 participants completed the online survey through the Qualtrics platform. The platform specifically targeted people living in Jakarta and South Sulawesi. There was an even split of participants in both regions, and across both genders. Demographic details of participants are available in Table 1. People in Jakarta were more likely to have higher incomes than those in South Sulawesi ($\chi^2=40.26$, $p<0.01$), as well as higher levels of education ($\chi^2=13.8$, $p<0.01$).

About half of the participants who completed the survey had either experienced COVID-19 symptoms since the beginning of February 2020 or reported being in contact with a diagnosed case of COVID-19. There was a significantly higher proportion of respondents in Jakarta that had received a COVID-19 diagnosis ($\chi^2=9.5$, $p<0.05$). A total of 40 percent of respondents had a family member diagnosed with COVID-19 and 14.6 percent of respondents reported that a family member had died from COVID-19-associated illness. While this was reportedly higher in Jakarta (79 percent) when compared with South Sulawesi (56 percent), there was no statistically significant difference.

Health literacy

Respondents living in Jakarta reported higher levels of health literacy ($\chi^2=5.2$, $p<0.05$) and more accurate beliefs associated with COVID-19 ($\chi^2=12.1$, $p<0.01$) compared with respondents from South Sulawesi. There was no significant difference in the proportion of respondents reporting incorrect beliefs about COVID-19 from either location.

Respondents living in South Sulawesi reported higher (but not statistically significant) concern for themselves (risk perception) regarding COVID-19 than those living in Jakarta.

Compared with respondents living in South Sulawesi, respondents living in Jakarta reported higher levels of trust in government ($\chi^2=9.1$, $p0.01$) and lower levels of negative attitudes regarding the extent of government control (i.e. lockdowns and restrictions) ($\chi^2=8.2$, $p0.01$).

A higher proportion of respondents in Jakarta reported that they comply with recommended health behaviours, such as being tested for ($\chi^2=6.5$, $p0.01$) and subsequently diagnosed with ($\chi^2=9.5$, $p<0.01$) COVID-19 compared with respondents in South Sulawesi. There was no significant difference in the proportion of respondents hospitalised in either location. There was an insignificantly high proportion of respondents living in Jakarta who reported a death from COVID-19 among their family members compared with those living in South Sulawesi.

Table 1. Demographic and educational profile of people in Jakarta and South Sulawesi who responded to a survey on compliance with COVID-19 behaviours

	Jakarta (%)	Sulawesi	Both (%)
Gender			
Male	116 (45.8)	135 (54.2)	251 (100)
Female	180 (52.6)	162 (47.4)	342 (100)
Don't want to share	1 (33.5)	2 (66.5)	3 (100)
TOTAL	297 (49.8)	299 (50.2)	596 (100)
Education			
< High school	79 (39.3)	122 (60.7)	201 (100)
> High school	221 (55.4)	178 (44.6)	399 (100)
TOTAL	300 (50.0)	300 (50.0)	600 (100)
Income			
Low	108 (36.9)	185 (63.1)	293 (100)
Middle	108 (61.4)	68 (38.6)	176 (100)
High	85 (64.4)	47 (35.6)	132 (100)
TOTAL	301 (50.1)	300 (49.9)	601 (100)

Table 2. Experiences of COVID-19 reported by respondents from Jakarta and South Sulawesi

	Jakarta (%)	Sulawesi (%)	Both (%)
Experienced symptoms of COVID-19			
Yes	134 (53.6)	116 (46.4)	250 (100)
No	167 (47.4)	185 (52.6)	352 (100)
TOTAL	301 (50.0)	301 (50.0)	602 (100)
Been in contact with a diagnosed case of COVID-19			
Yes	186 (51.5)	175 (48.5)	361 (100)
No	115 (47.7)	126 (52.3)	241 (100)
TOTAL	301 (50.0)	301 (50.0)	602 (100)
Been tested for COVID-19			
Yes	223 (53.4)	194 (46.6)	417 (100)
No	78 (42.1)	107 (57.9)	185 (100)
TOTAL	301 (50.0)	301 (50.0)	602 (100)
Diagnosed with COVID-19			
Yes	48 (70.5)	20 (29.5)	68 (100)
No	175 (50.1)	174 (49.9)	349 (100)
TOTAL	223 (53.5)	194 (46.5)	417 (100)



A woman wearing a white face mask is seated at a wooden table in a cafe, working on a laptop. The scene is dimly lit, with warm light coming from a window in the background. Another person is visible in the background, also seated at a table. The overall atmosphere is quiet and focused.

Overall, people in South Sulawesi reported higher rates of participation in behaviours deemed risky for the transmission of COVID-19 compared with those in Jakarta.

Image credit: Bagir Bahana

Risky behaviours

Overall, people in South Sulawesi reported higher rates of participation in behaviours deemed risky for the transmission of COVID-19 compared with those in Jakarta. A higher proportion of people living in South Sulawesi reported leaving their house to visit friends ($\chi^2=7.2, p<0.01$), and leaving their home to travel and visit friends that lived far away ($\chi^2=6.5, p<0.01$), compared with people living in Jakarta (Table 3). A higher proportion of people living in Jakarta reported leaving home to go to a store than those living in South Sulawesi, but a lower proportion attended their school or workplace. These differences were not statistically significant.

Protective behaviours

Protective behaviours are those that are recommended to prevent transmission and infection with COVID-19. Overall, a higher proportion of people living in Jakarta reported higher compliance with protective behaviours than those living in South Sulawesi (Table 4). A lower proportion of people living in South Sulawesi wore a mask when leaving the house ($\chi^2=5.7, p<0.05$), maintained social distancing when leaving the house ($\chi^2=28.625, p<0.01$), frequently sanitised surfaces ($\chi^2=12.87, p<0.01$) and washed their hands frequently ($\chi^2=22.16, p<0.01$) compared with those living in Jakarta.

Vaccination

A higher proportion of respondents living in Jakarta reported an intention to become vaccinated compared with those living in South Sulawesi ($\chi^2=4.78, p<0.05$).

Table 3. Risky behaviours for COVID-19 reported by respondents from Jakarta and South Sulawesi

	Jakarta (%)	Sulawesi (%)	Both (%)
Go to store			
Never	43 (14.3)	34 (11.3)	77 (12.7)
1-2 times	194 (64.5)	186 (61.8)	380 (63.2)
3-4 times	33 (11)	59 (19.6)	92 (15.3)
4-5 times	15 (5)	12 (4)	27 (4.5)
6 or more times	16 (5.3)	10 (3.3)	26 (4.3)
TOTAL	301 (100)	301 (100)	602 (100)
Go to school or workplace			
Never	136 (45.2)	111 (36.9)	247 (41.0)
1-2 times	71 (23.6)	75 (24.9)	146 (24.3)
3-4 times	43 (14.3)	46 (15.3)	89 (14.8)
4-5 times	15 (5)	12 (4)	27 (4.5)
6 or more times	16 (5.3)	10 (3.3)	26 (4.3)
TOTAL	301 (100)	301 (100)	602 (100)
Visit friends of family nearby			
Never	158 (52.5)	89 (29.6)	247 (41.0)
1-2 times	102 (33.9)	137 (45.5)	239 (39.5)
3-4 times	23 (7.6)	34 (11.3)	57 (9.5)
4-5 times	3 (1.0)	9 (3.0)	12 (2.0)
6 or more times	6 (2.0)	15 (5.0)	21 (3.5)
TOTAL	301 (100)	301 (100)	602 (100)
Visit friends or family more than 1 minute away			
Never	176 (58.5)	117 (38.9)	293 (48.7)
1-2 times	102 (33.9)	137 (45.5)	239 (39.5)
3-4 times	16 (5.3)	27 (9.0)	43 (7.5)
4-5 times	3 (1.0)	7 (2.3)	10 (1.6)
6 or more times	4 (1.3)	13 (4.3)	17 (2.7)
TOTAL	301 (100)	301 (100)	602 (100)
Attend a public event			
Never	241 (80.1)	166 (55.1)	407 (67.6)
1-2 times	47 (15.6)	105 (34.9)	152 (25.2)
3-4 times	8 (2.7)	23 (7.6)	31 (5.1)
4-5 times	1 (0.3)	3 (1.0)	4 (0.7)
6 or more times	4 (1.3)	4 (1.3)	8 (1.4)
TOTAL	301 (100)	301 (100)	602 (100)

Table 4. Protective behaviours for COVID-19 reported by respondents from Jakarta and South Sulawesi

	Jakarta (%)	Sulawesi (%)	Both (%)
Wear a mask			
Never	11 (3.7)	9 (3.0)	20 (3.3)
Seldom	15 (5.0)	29 (9.6)	44 (7.3)
Sometimes	9 (3.0)	18 (6.0)	27 (4.5)
Often	18 (6.0)	35 (11.6)	53 (8.8)
Always	248 (82.4)	210 (69.8)	458 (76.0)
TOTAL	301 (100)	301 (100)	602 (100)
Maintain social distancing			
Never	2 (0.7)	10 (3.3)	12 (1.9)
Seldom	11 (3.7)	25 (8.3)	36 (5.9)
Sometimes	31 (10.3)	65 (21.6)	96 (15.0)
Often	80 (6.6)	94 (31.2)	174 (30.0)
Always	177 (58.8)	107 (35.5)	284 (47.2)
TOTAL	301 (100)	301 (100)	602 (100)
Wipe/sanitise surfaces			
Never	11 (3.7)	23 (7.6)	34 (5.6)
Seldom	31 (10.3)	44 (14.6)	75 (12.4)
Sometimes	55 (18.3)	73 (24.3)	128 (21.3)
Often	76 (25.2)	60 (19.9)	136 (22.7)
Always	128 (42.5)	101 (33.6)	229 (38.0)
TOTAL	301 (100)	301 (100)	602 (100)
Wash hands immediately after coming home			
Never	2 (0.7)	2 (0.7)	4 (0.8)
Seldom	6 (2.0)	21 (7.0)	27 (3.8)
Sometimes	12 (4.0)	36 (12.0)	48 (8.2)
Often	60 (19.9)	74 (24.6)	134 (22.5)
Always	221 (73.4)	168 (55.8)	389 (64.7)
TOTAL	301 (100)	301 (100)	602 (100)
Attend a public event			
Never	241 (80.1)	166 (55.1)	407 (67.6)
1-2 times	47 (15.6)	105 (34.9)	152 (25.2)
3-4 times	8 (2.7)	23 (7.6)	31 (5.1)
4-5 times	1 (0.3)	3 (1.0)	4 (0.7)
6 or more times	4 (1.3)	4 (1.3)	8 (1.4)
TOTAL	301 (100)	301 (100)	602 (100)

Research has highlighted the importance of health literacy in understanding COVID-19 symptoms, identifying behaviours that prevent infection.



Image credit: Mufid Majnun

CONCLUSION AND RECOMMENDATIONS

The key findings from the survey are that compared with residents of South Sulawesi residents of Jakarta have:

- greater personal experiences of COVID-19 and higher numbers of deaths in their families
- lower levels of perception of personal risk
- higher levels of health literacy
- lower levels of risky behaviour
- higher levels of compliance with public health directives
- higher levels of trust in government

This means that overall, people living in Jakarta reported outcomes that indicate they have a lower personal risk of developing COVID-19 and a lower risk of transmitting SARS-CoV-2 to their communities compared with people living in South Sulawesi. This set of outcomes is explained in Figure 2, which depicts the relationship between each of the results and their subsequent impact on health behaviours during a pandemic.

Higher levels of health literacy would support the finding of more accurate beliefs about COVID-19 among those living in Jakarta. Health literacy is often supported by higher levels

of education and income – which was seen in our respondents from Jakarta when compared with those living in South Sulawesi. In the context of the pandemic, research has highlighted the importance of health literacy in understanding COVID-19 symptoms, identifying behaviours that prevent infection, finding appropriate information and understanding government messaging. A study conducted by McCaffery et al.⁴⁶ showed that people with lower health literacy were less likely to report social distancing as important in preventing COVID-19 transmission and were more likely to endorse misinformed beliefs about COVID-19 and vaccinations when compared with those with adequate health literacy. Research conducted by Silva and Santos (2021) found that better health literacy was associated with better attitudes towards preventive measures against COVID-19.⁴⁷

There appears to be an association between greater health literacy, higher levels of trust in government and lower levels of negative attitudes towards the government controls such as lockdowns and restrictions, which appears to be a logical causal process. However, while the link between health literacy and trust in medical services has been described,⁴⁸ there is limited research linking health literacy and trust in government specifically.

In the context of a pandemic, the government controls the implementation and regulation of public health messages and requirements for individuals to follow. It could be argued that those who have higher health literacy and/or more accurate beliefs about COVID-19 may be more likely to see the effectiveness of the protocols aimed at slowing the spread of the virus. These findings are supported by reports of a crisis in public confidence in the government among people living in Makassar, which has been described by Haryanto (2021) as the worst in Indonesia – indicating government failure at the local level.⁴⁹ This is important because Hutagalung et al. (2019) associated inequality with public trust as measured by the Gini coefficient.⁵⁰ However, they showed that the Gini coefficient for Jakarta and South Sulawesi are similar, which suggests that inequality is unlikely to contribute to the low trust in government observed in this study. Participation in protective behaviours also requires additional financial support at an individual level for the purchase of personal protective wear (i.e. face masks) as well as resources for cleaning and disinfecting the home. The role income has in boosting protective behaviours was not assessed in this study.

46. K. McCaffery et al., 'Health literacy and disparities in COVID-19-related knowledge, attitudes, beliefs and behaviours in Australia', *Public Health Research & Practice*, 2020. 47. M.J. Silva & P. Santos, 'The Impact of Health Literacy on Knowledge and Attitudes towards Preventive Strategies against COVID-19: A Cross-Sectional Study', *International Journal of Environmental Research and Public Health*, 2021, and McCaffery et al. 48. Adiyoso & Wilopo, 2021. 49. Haryanto, 'Public Trust Deficit and Failed Governance: The Response to COVID-19 in Makassar Indonesia', *JSTOR*, 2021. 50. E.N. Hutagalung, T. Akita, & M. Fahmi, 'Inequality and Political Trust in Indonesia,' *Working Papers in Economics and Development Studies*, Department of Economics, Padjadjaran University, 2019.

There is currently limited literature that explores the relationship between an individual's experience of COVID-19 and their concerns about their own health and the health of their community. In addition, there is limited research that explores an individual's experience of contracting an infectious disease and becoming ill during a pandemic, and its influence on their concerns. Despite this, theoretical models highlight that an individual's personal experience of an illness increases their perception of risk and their concern. One theoretical model in particular – the common-sense model of illness, first established by Leventhal et al. – incorporates the individual's perceptions and beliefs (representations) of illness, and how they are important in mediating an individual's response to health threats. In this model, personal experience of an illness is integral to the development of coping mechanisms.⁵¹ Over a lifetime, a person creates an understanding of their 'normal self' or 'normal functioning'. Once we have an experience with a particular illness and the learnt response (i.e. illness: sore throat; learnt response: lozenges), we build an understanding of ways to get back from illness to our normal self. These views of our normal self and the appropriate responses are enriched by observation, social comparisons, communications from friends, family and mass media over a lifetime. Therefore, successful strategies for management are dependent on the threat to the individual's health, and the resources available to the individual and the social context and culture.⁵² In the context of COVID-19, individuals have been required to relearn coping mechanisms for

common illness stimuli. Where one may usually experience symptoms of COVID-19, such as a sore throat, runny nose, dry cough, people may have previously consumed some pain medication and carried on with their daily tasks; in the new context we are expecting people to isolate, get tested and wear a mask. The results of the survey indicate that people in Jakarta were far more likely to be diagnosed with COVID-19 when compared with those in South Sulawesi and were also more likely to comply with protective behaviours. The model assumed that this relationship would occur through an increase in concern for self and for community, which would strengthen trust in the government response, and therefore bolster protective health behaviours. However, this relationship wasn't demonstrated. The additional problem with the new mechanisms is that they're often enforced by public policy. These policies are in a constant state of flux and are often different within and between countries. This makes it difficult to formulate new habits and entrench new coping mechanisms in community culture to mitigate the spread of disease.

The aim of this study was to explore and understand the factors associated with compliance and lack of compliance with regulations and behaviour change interventions relating to the mitigation and control of COVID-19 in two major population centres in Indonesia. Overall, the findings indicate that individuals with higher levels of literacy and education who display more accurate beliefs about the coronavirus are more likely to report compliance with COVID-19 protective behaviours (such as hygiene, mask wearing and social

distancing). It was hypothesised that an individual's personal experience (i.e. either a personal diagnosis, or a diagnosis or death of a friend or family member) may result in an increase in risk perception and their compliance. However, despite reporting fewer personal experiences of COVID-19, people living in South Sulawesi reported higher personal concern. This may suggest that higher rates of personal experience (i.e. for individuals in Jakarta) influence compliance, but not through risk perception. It may then be important for health promotion efforts to reduce rhetoric about risk, fear and harm, and focus more on personal and familial experiences with the disease.

An important finding from this study was the critical importance of local governance in achieving high levels of compliance with public health interventions. The analysis by Haryanto (2021) identified a series of interrelated factors associated with poor governance of the local COVID-19 response that were directly linked to public resistance to and demonstrations against public health measures, especially the enforcement of directives.⁵³

This suggests that good governance is perhaps the most important determinant of public acceptance and compliance. This means that risk communication should not be directed at risk avoidance, but instead should inform the public and present clear, consistent and equitable statements to enhance trust as a primary goal.

51. H. Leventhal, L. Alison Phillips, & E. Burns, 'The Common-Sense Model of Self-Regulation (CSM): a dynamic framework for understanding illness self-management', *Journal of Behavioural Medicine*, 2016, 39, 6. 52. Ibid. 53. Haryanto, 2021.

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THE AUSTRALIA-INDONESIA CENTRE:



POLICY PARTNERS:



PARTNERS FOR IMPACT:



Program Management Team:

Dr Eugene Sebastian,
PAIR Program Director

Helen Fletcher-Kennedy,
Chief Operating Officer

Dr Leonardo Pegoraro,
PAIR Program Manager

Dr Hasnawati Saleh,
PAIR Research Coordinator

Dr Martijn van der Kamp,
PAIR Team Capability Coordinator

Marlene Millott,
PAIR Program Officer

Fadhilah Trya Wulandari,
PAIR Program Officer

Research Advisory Panel:

Professor Budu, *the South Sulawesi Provincial Government's Development Acceleration Team (TGUPP)*

Bronwyn Robbins, *Australian Consul General in Makassar*

Dr Elan Satriawan, *Chief of Policy Working Group, National Team for the Acceleration of Poverty Reduction (TNP2K)*

Dr(HC) Erna Witoelar, *Former UN Special Ambassador for Millennium Development Goals (MDGs) in the Asia Pacific*

Dr Eugene Sebastian, *Executive Director, The Australia-Indonesia Centre*

Dr Hasnawati Saleh, *PAIR Research Coordinator, The Australia-Indonesia Centre*

Professor Heri Hermansyah, *Acting Director of Research and Community Engagement, Ministry of Research and Technology, Republic of Indonesia*

Dr Ishak Salim, *Co-Founder Indonesian Diffable Movement for Equality*

Professor Jamaluddin Jompa, *Advisor for Marine Ecology at the RI Ministry of Maritime Affairs and Fisheries*

Jana Hertz, *Team Leader at the Knowledge Sector Initiative*

Muhammad Sani Azis, *Regional Coordinator (South Sulawesi), Indonesian Seaweed Association (ARLI)*

Dr Musdhalifah Machmud, *Deputy Minister for Food and Agriculture, RI Coordinating Ministry for Economic Affairs*

Prakosa Hadi Takariyanto, *Technical Director PT Pelabuhan Indonesia IV (Persero)*

Pratiwi Hamdhana, *Founder and Managing Director, Tenoon, Driver Engagement, Gojek Makassar*

Professor Wihana Kirana Jaya, *Special Staff to the RI Minister for Economic Affairs and Transportation Investment, Ministry of Transportation*

Tim Stapleton, *Minister-Counsellor (Economic, Investment and Infrastructure), Australian Embassy, Jakarta*

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